Result Page

Device and method for subjecting a culture with a gaseous medium as well as exposition device the invention relates to a device and a method for subjecting a culture with a gaseous medium, received in a culture vessel, as well as an exposition device, received in a culture vessel.

From the state of the art it is known to supply to the culture contained in a culture vessel liquid nutrient mediums.

Like that known in particular is to exchange a certain liquid nutrient medium within the culture vessel by another nutrient medium to adjust a certain liquid level of the liquid nutrient medium within the culture vessel and empty the culture vessel. An example for such culture vessel is in the document DE 196 19 114 aluminium shown.

Like that it is further known to subject the cultures within the culture vessel with a gaseous medium to thus expose the cell cultures to predetermined damaging and therapeutic conditions. From the DE 198 01 762 it is further known to bring beside the treatment of cell cultures with gases and/or aerosols of also particulate active ingredients more immediate with the cell cultures in contact. For this the particles which can be examined on the cell cultures are up-made dust and if necessary. bottom lowering and lifting the nutrient fluid level within the culture vessel of the cell culture lifted and/or. with this in contact brought. 9 universe these known culture vessels it is common that a certain gaseous atmosphere can become adjusted above the culture contained in the culture vessel by supplies of the desired atmosphere. This happens either, by the culture vessel with the ambient air communicated, D. h. the ambient air over an entrance opening into the culture vessel to arrive can, or as applied over the entrance off nung a desired atmosphere becomes for example of bottom slight pressure a standing supply bottle to the culture. With latter method flows after opening the pressure valve in the supply bottle due to the initial at the beginning of chen difference of

top

pressure between the atmosphere in the supply bottle and the atmosphere in the culture vessel so long somewhat the atmosphere out of the supply bottle into the culture vessel, until itself a static equal in pressure weight has adjusted. Afterwards there is no other current to the culture vessel, only right ones not toward the culture surface. The single drive of a movement of the particles in that gaseous mediums made then over the diffusion mechanism. In principle thus the gaseous medium becomes static applied in both cases.

The disadvantage of these known methods for subjecting the culture with a gaseous medium lies in the fact that no temporal and spatial homogeneous distribution of the atmosphere over the entire cell culture surface and/or. with several in several various culture vessels received cell cultures over the several cell culture surfaces ensured will can and thus for example the results of the experiments with these cell cultures in compound with the atmosphere statistical undesirable fluctuations exposed are.

In particular with gaseous mediums, which particle with itself leads, leaves itself with the prior art methods and/or.

Devices homogeneous distribution of the particles on the surface of the cell cultures do not obtain, what can lead to inaccurate measurement results.

The invention is the basis the object to develop the known devices and methods further for subjecting a culture with a gaseous medium, received in a culture vessel, going by that one can become if possible homogeneous distribution of the gaseous medium on the culture surface achieved, which can be subjected.

The invention solves this object in each case with the Gegenstän that of the claims 1 and 18.

Preferable embodiments are in the Unteransprüchen described.

With the device according to invention for subjecting (to the exposure) a culture with (in) a gaseous medium, received in a culture vessel, this for producing a targeted current of the gaseous medium over essentially the whole surface of the culture designed is. With the corresponding invention process for subjecting (to the exposure) a culture with (in) a gaseous medium, received in a culture vessel, a targeted current of the gaseous medium becomes generated over essentially the whole surface of the culture. A bottom targeted current becomes in particular one type controllable current understood, which flows obligation-guided and continuous (interrupted or continuous) over the surface, that the Strö is mungsverlauf in advance after certain criteria the optimized, is it in such a manner in its temporal or spatial homogeneity. With a current the ratios of the medium which can be subjected (concentrations, homogeneities, etc.) can be adjusted above the culture very many more accurate opposite the static application of a gaseous medium known from the state of the art.

In addition will it for the first time possible to lead also alone the outer RK mosphäre (outside air) as gaseous medium zufriedenstel lend over the culture surface. With the static situation for example die'in the outside air delivered reaction products of the cultures only insufficient ones were removed and could falsify thus the experimental result. With the adjusting of a current now favourably a very much larger bandwidth at simulation practicabilities is given, in particular regarding the adjustment of the concentration of the gaseous medium above the culture.

Also hereby for the first time the problematic treatment of the cultures with solid particles is satisfactory dissolved (see above). Now the solid particles in the gaseous medium can become entrained and become with the current over the surface passed. So for example the load of lung cells can become through particle by changing the current above the lung cells examined.

The gaseous medium can be present according to invention as pure gas, D. h. all cloths contained in it (atoms, molecules, etc.) are in the gas phase, and/or it can serve also as carriers for Fest-und/or liquid materials.

Know in particular so aerosols, atomized liquids, small liquid droplets (z. B. Plant protection agent as spray, etc.), suspended particle, solid particle (z. B.

Wood dust, etc.), gaseous suspensions, atomized suspensions or emulsions as to supporting substances contained in the carrier gas its.

Prefered one covers the device an input to the introduction of the gaseous medium, an output for deriving the gaseous medium, whereby the culture is in the culture vessel flowtechnical seen between the input and the output arranged, and an agent for continuous producing of a pressure difference between the input and the output.

Prefered one exhibits the device a flow guidance, which covers the subsequent: at least one flow introducing means with two ends, its first end into the culture vessel dips and its second end with the input a communicated, and at least one current deriving means with two ends, its first end into the culture vessel immerses and its second end with the output communicated. The gaseous medium which can be subjected becomes favourable as courts current direct the surface of the culture obligation-guided with this flow guidance.

Prefered one is the agent for continuous producing of a pressure difference a pump, which is arranged with their suction-side terminal flowtechnical after the culture vessel. For favourable adjusting of the Strömungsgeschwindig the medium above the surface of the cell culture is more controllable the pump keit in its pump power thereby particularly prefered.

Prefered one is the device for parallel subjecting to cultures with the gaseous medium designed, received in several culture vessels, whereby the flow guidance covers for this an appropriate number at flow in leit-und deriving means, and in each case a pair an accurate culture vessel associated existing from Strömungseinleit-und a flow deriving means is. Thus it is possible to accomplish parallel several studies with same or different cultures those in each case everything the same composition (Prúf) - of the medium obtained to up-improve over the measurement results statistical and/or. to examine a corresponding medium by means of several cultures simultaneous on various reactions.

The several flow introducing means are all over a common turbulence chamber with the input connected for favourable other homogenizing of the gaseous medium before overcurrents of the single culture surfaces. In addition for this the prefered several Strö is mungsableitmittel all connected over a common output chamber with the pump.

For obtaining the flow in guidance means in the range of their first end in its sectional shape prefered in for instance the sectional shape of the associated culture vessel corresponds to a current over essentially the whole surface of a culture. In addition for this the device is prefered medium designed migen for subjecting to culture vessels, which exhibit a circular cross section, with one gasför, whereby the flow introducing means have a circular cross section at least in the range of their first end, and the outer diameter of a Strö mungseinleitmittels than the inner diameter of the associated culture vessel in the proximity of the surface of the culture received in the culture vessel is somewhat smaller.

To obtaining a defined current in close proximity (cell) - culture surface immerses the flow in guidance means prefered into the associated culture vessel to short above the surface of the culture received in the respective culture vessel.

Prefered one is the device for subjecting to culture vessels, which exhibit themselves a tapering cross section conical to the container soil, with a gaseous medium designed, whereby the flow deriving means are in such a manner formed that they immerse a short distance concerning the container-high of the culture vessel only into the associated culture vessel. Hereby a particularly homogeneous current in the range of the culture surface achieved becomes favourable.

As other prefered measures for improving the Strö mungsprofils and/or simplifying the overall construction the subsequent provided becomes: - the flow introducing means is as straight cylinder pipe formed, its second end a certain
Distance far into the common turbulence chamber rises up, - the flow deriving means is as straight cylinder tube formed, its second end into the common
Output chamber flows, - the cylinder outside diameter of the flow introducing with tels is somewhat smaller than the Zylinderinnendurchmes more ser the flow deriving means and the flow in guidance means is central within the flow deriving by means of guided, and/or the

difference between ZylinderauSen-und that
Cylinder inside diameter plus the cylinder wall of the strong flow deriving means corresponds in for instance the difference of the inner diameter of the Kulturgefä of sses in height of the first end of the flow introducing with tel and in height of the first end current by means of.

For obtaining as compact a construction as possible the output chamber is prefered between the turbulence chamber and the culture vessels arranged which can be taken up, whereby the flow introducing means are by the output chamber guided and of this flowtechnical isolated.

The invention relates to furthermore an exposition device for supplying a culture received in a culture vessel with a liquid medium, which furthermore a device according to invention exhibits for subjecting a culture with a gaseous medium, received in a culture vessel. The exposition device can become for example mobile atmospheres environmentalrelevant for studies both in Innen-als also within the outside space range the determination of the health-endangering potential at cells used. The cultures can thereby with the field tests favourably over the liquid medium supplied (D. h.) become nourished.

Prefered one covers the exposition device furthermore the subsequent: , receiving means to the uptake of the culture unit, and a mechanism exhibit a culture unit, which serve four culture vessel (EN) for the uptake of at least one, in particular, and a supply unit for supplying the culture (EN) in () the culture vessel (EN) with the liquid medium to the automatic positioning and ouples of the culture unit with the device for subjecting the culture with a gaseous medium. Favourably hereby a particularly simple handling is possible exposition before direction, in particular regarding the exchange of culture vessels.

Prefered one exhibits the culture unit furthermore a keep at a moderate temperaturable trough to the uptake of the culture vessels. Favourably the cultures can become thus also outside of the laboratory on temperatures maintained, which for the survival and/or. Growth of the cultures necessary are.

Prefered one exhibits the exposition device furthermore a resilient supported contact plate, which arrive in the coupling position of the culture unit in contact with the edges of container of the culture vessels and give way to resilient. Thereby the contact pressure of the culture vessels becomes favourable to the admission device and concomitantly the tightness in this place increased. Whole particularly prefered is for this sealants into the contact plate admitted, at least in the ranges of the contact plate, which come in the coupling position with the edges of container of the culture vessels into contact.

The features stressed in the exposition device in combination can become favourably also independently, in particular without the device subjecting a culture with a gaseous medium, received in a culture vessel, realized.

The invention as well as other advantages of the invention become subsequent more near explained on the basis a prefered embodiment with reference to the accompanying drawing, in of the: Figs la, b in each case two different Seitenansich ten an exposition device in accordance with the prefered embodiment of the Erfin dung show, fig 2 a schematic view of a device for subjecting a culture with a gaseous, received in a culture vessel
Medium in accordance with the prefered remark with play shows, with which the radio in principle tionsweise of this device explained who is that, and fig 3 a more detailed view of the device shown in fig 2 is.

(Mobile) the exposition device exhibits a frame 2, which is 4 attached at a bottom plate. The bottom plate 4 stands on three or several höhenverstellbaren feet 6 for horizontal aligning of a liquid upper a flat liquid received in the exposition device (see below) in the gravity field. At the frame 2 a center plate 8 movable in the height is 10 arranged for taking up a culture unit. The center plate 8 exhibits for this a type drawer subject, into which the box shaped bottom portion of the culture unit can become 10 pushed in and there fixed in its layer. The determination becomes 12 ensured thereby over a spring/a groove guide.

The culture unit 10 covers a keep at a moderate temperaturable metal block 14, which exhibits a tub-shaped recess to the uptake of a trough 16, in height of its bottom portion and above its bottom portion a reservoir 18 (for example a medium bottle) for taking up a liquid medium as well as a hose pump 20 for promoting the liquid medium between the trough 16 and the reservoir 18.

The trough 16 points again not represented receiving means for the uptake from culture vessels 22 (z. B. Transwell of insert) up, whereby the cultures in the culture vessels become 22 received. For example the culture device disclosed in the German patent 198 01 763 can become as culture vessel 22 used in this place. The disclosure of this patent is included hereby by reference to the full extent into the instant application.

These culture vessels 22 (Transwell insert) have for example a cup-like form with circular cross section, whereby itself the diameter of the cup opening up to the cup soil conical tapered. The cup soil consists of a porous plastic material, to the example of polyethylene terephthalate. The cell culture INSERT represents one flüs sigkeitsdurchlässige support structure for a membrane, which can be prepared depending upon requirement of the cells from different plastic materials, which can be cultivated, to z. B. likewise polyethylene terephthalate. The membrane carries thereby the cell culture.

Furthermore the culture unit covers 10 at least one, preferably two or also several not represented sensors and an associated not represented tax /Regelungseinheit, which regulates the cultures in the culture vessels 22 pulse-moderate supplied (pulse-moderate control of the supply and removal of for example nutrient fluid) and the level of the medium within the culture vessels 22. Thus for example the cultures can be nourished within the culture vessels

22 periodic alternate basal and submers, as the liquid level of the nutrient fluid becomes corresponding above or below the surface of the cultures adjusted. For other details concerning the pulse control and level regulation of the liquid medium within the culture vessels 22 likewise to the patent application accompanying in the plant one refers. It is noted that the difference between the culture device described in the accompanying patent application and the here described corresponding trough 16 consists of the fact that in the trough 16 the culture vessels are not any more over modules with in each case three culture vessels introduced, but direct in the trough 16 hangs. The supply of the Kulturgefae 22 in the trough 16 with nutrient fluid made here over the lid of the trough 16, whereby the liquid can penetrate 22 then over the porous bottom of the culture vessels into these. Also the not represented sensors are now no more per module provided, but can at the side wall of the trough 16 mounted be, 'in the height more adjustable, so that they can detect various liquid levels within the trough 16. For this an arbitrary number at (höhenverstellbaren) sensors can be provided, which are all in different height at the side wall of the trough 16 mounted. Thus for example the liquid level can become within the trough 16 so controlled that simultaneous some cultures are nourished submers, other however still basal (if the culture vessels 22 different submergences into the trough 16 to exhibit). Alternative one can be taken over naturally also the culture device unchanged described in the accompanying patent application.

Furthermore (not represented) temperature sensors to or within the trough 16 provided, for a temperature control of the liquid can be within the trough 16.

Altogether the integrated culture unit of 10 thus all elements for the optimum supply of the cultures (cells, etc.) during the exposition phase in the keep at a moderate temperaturable metal block 14. The center plate 8 is raised thereby after Bestük kung with the cultures in the Kulturgefä towards 22 by means of a geared motor 24 and a threaded spindle 26 to an admission device 28, which can be examined. The admission device 28 is 32 mounted including their associated vacuum pump 30 on a cover plate.

Subsequent one becomes the admission device 28 with reference to the figs 2 and 3 in the detail described. The admission device 28 sits down essentially from an upper turbulence chamber 34, and only to an output chamber 38 (both chambers 34 from each other arranged under it separated by a partition wall 36 and. 38 forms thus a parliamentary system of two Houses), for several flow introducing pipes 40 with in each case a first 41a and a second end 41b, several flow deriving pipes 42 with in each case a first 43a and a second end 43b, a suction port 44 and the vacuum pump 30 together. The suction port 44 (those for example as intakes with a certain height of formed to be can do, in order to suck in the outside atmosphere significant above the air layer, those if necessary. by evaporation phenomena undesirable cloths of the entire exposition device contaminated is and the measurement result would falsify), becomes sucked over which the medium which can be subjected, is 34 arranged at the top of the turbulence chamber. The medium which can be subjected can do ent neither from an other not represented supply bottle or a generating unit to producing the

medium (diesel engine, gasoline engine, reaction tank, in which the medium which can be subjected becomes only from or several starting products a generated, etc.) to come, if a gaseous medium known in its composition is to become the cell cultures introduced, or with application of the exposition device in a field test from that outer one ssenatmösphäre. Thus for example the effects various natural occurring atmospheres on the growth or the general behavior of cell cultures (for example lung cells, etc.) can become examined.

The flow introducing pipes 40 are as straight cylinder tubes (z. B. as metal sleeve) with a circular cross section formed, which is same over their whole length. The flow introducing pipes 40 rise up with its second end 41b a piece far from the underside of the turbulence chamber 34, D. h. from the partition wall 36, into the interior of the turbulence chamber 34, D penetrate the output chamber 38 of their top. h. the partition wall 36, up to their underside 46 and subsequent with its first end 41a a piece rises up the far over underside 46 outside in the free (with not put on culture vessel 22). As from fig 3 significant becomes more visible, the flow introducing pipes are 40 48 sealed and by means of suitable attachment means 50 airtight opposite the output chamber 38 over sealing rings both against lateral and axial shift-fixed. Alternative ones can be the flow deriving pipes 42 in a not represented embodiment also as mehre RH separate in each case, around the outer circumference a flow introducing pipe 40 arranged tubes with small diameter formed. The flow deriving pipes 42 are likewise like the Strö mungseinleitrohre 40 as straight cylinder tubes (z. B. as metal sleeve) with a circular cross section formed, which is same over their whole length. Their diameter is however somewhat large dimensioned as the diameters of the flow introducing pipes 40. The flow in of conduit tubes 40 central within the flow deriving pipes 42 runs and stands out at the underside 46 of the output chamber a piece far from the flow deriving pipes 42. This prominent length is so dimensioned that with a conical culture vessel 22 tapering to the bottom the flow in of conduit tubes 40 to scarce rises up itself above the surface of the cell culture 23 rich, the flow off of conduit tubes 42 however only a short piece from above, located therein, into the culture vessel 22. The outer diameter of the flow introducing pipes is 40 so dimensioned that it is somewhat smaller than the inner diameter of the culture vessel 22 in proximity of the surface of the cell culture 23. Altogether thus an annular gap on first forms with put on culture vessel 22. End 40a and/or. the lower delta of the Strö mungseinleitrohre 40 between their outer wall and the inner wall of the culture vessel 22, by which the gaseous medium can flow. This annular gap can become also on other manner than over the described type with the two into one another pushed cylinder tubes 40 and 42 achieved. The flow pattern by the admission device 28 is with single arrows in fig 2 the indicated.

Altogether the gaseous medium flows due to the pressure difference between the intake 44 and the output 39, which become 30 generated by the vacuum pump connected at the output 39 of the output chamber 38, thus by the intake 44, in the turbulence chamber 34 in such a way swirled that the gaseous medium as homogeneous by all flow introducing pipes 40 an influxes as possible can, from there ge is enough it on the surface of the cell cultures 23 in the single culture vessels 22, flows there continuous over those essentially the entire cell

culture surface and along the container inner walls of the culture vessels 22 upward to the annular entrance gap between flow introducing 40 and deriving pipe 42, by the flow deriving pipe 42 into the output chamber 38 and from there over the output 39, the vacuum pump 30 and the pump exit 31 in the free.

In the exposition device shown in fig 1 a fitted with springs contact plate 52 at the underside 46 of the output chamber 38, which gives way upward while raising of the center plate with the culture unit 10 with contact resilient and manufactures thus a certain contact pressure of the outer Senrandes of the culture vessels 22 against a silicone mat 53 let in in the contact plate 52, is. The silicone seal can be alternative (not shown) also only annular around the flow deriving pipes 42 around into the contact plate 52 admitted. This provides for an airtight conclusion of the interior of the culture vessels 22 approximately over the outside space. With the fact ensured becomes that each cell culture is 23 in principle an identical composition of the atmosphere exposed, since all cell cultures 23 the atmosphere obtained sucked by a single suction port 44, which becomes subsequent still 34 in such a manner homogenized in the turbulence chamber that possible concentration differences become seen again balanced over the flowing in cross section.

The admission device 28 is 52 fitted thereby either over spring means 54 on the contact plate (whereby the contact plate 52 direct with the cover plate 32 coupled is). Hereby ensured becomes that with engagements of the spring means 54 the first ends 41a and 43a of the Strö mungseinleit-40 and/or - deriving pipes 42 independent from the engage-deep of the spring means 54 always same far into the culture vessels 22 immerse. On the other hand the contact plate 52 over the spring means 54 and the Beaufschla can be gungsvorrichtung 28 direct with the cover plate 32 coupled. Thus varied however depending upon engage-deep of the Fe that by means of 54 when pressing the culture unit 10 against the contact-burst 52 also the submergence of the Strömungseinleit-40 and/or. deriving pipes 42 into the culture vessels 22.

The pump power of the vacuum pump 30 is more controllable wähl-und, so that in particular the Strömungsgeschwindkeit can become 23 changed above the culture. So for example the concentration of pollutants contained in the atmosphere can become artificial increased by increasing the flow rate, since with increased Strömungsge schwindigkeit per unit time a larger amount of these pollutants at the surface is present. This can be in cases favourably, in those the cells in principle a higher photograph rate for this pollutant has (D. h. with higher concentrations also more pollutants per unit time to take up can) and thus either in shorter time a measurement performed will can or a series of measurements artificial adjusted varying concentrations received become can. Also regeneration behavior of cells, admission tracing can become by stopping the vacuum pump 30 inserted with an experiment determining. These pauses know also with time periods of submerser supply of the liquid medium over the hose pump 20 collapse.

Result Page

Claims: V 1. Device for subjecting one in a Kulturge barrel (22) of received culture (23) with one gasförmi towards medium, characterised in that it to the Erzeu towards a targeted current of the gaseous medium over essentially the whole surface of the culture (23) designed is.

2. Device according to claim 1, with: - an input (44) to the introduction of the gaseous Medium, - an output (31) to deriving the gaseous
Medium, whereby the culture (23) in the culture vessel (22) flowtechnical seen between a course (44) and the output (31) the arranged is, and v - an agent (30) for continuous producing of a pressure difference between the input (44) and the output (31).

3. Device according to claim 2 with a flow guidance (40, 42), those the subsequent covers: - at least one flow introducing means (40) with two ends (41a, b), its first end (41a) into the culture vessel (22) immerses and its second
End (41b) with the input (44) communicated, and - at least one flow deriving means (42) with two ends (43a, b), its first end (43a) into the culture vessel (22) immerses and its second End (43b) with the output (31) communicated.

4. Device according to claim 2 or 3, with which that
Agent for continuous producing of a Druckdiffe renz a pump (30) is, with its suction-side Terminal flowtechnical after the culture vessel (22) arranged is.

top

5. Device according to claim 3 or 4, which lelen to paral subjecting to cultures (23) with the gaseous medium designed, received in several culture vessels (22), are, whereby the flow guidance (40, 42) for this an appropriate number to flow introducing (40) and deriving means (42) covers, and in each case a Kulturge barrel (of 22) associated accurate from flow introducing (40) and a Strömungsab guidance means (42) an existing pair is.

6. Device according to claim 5, with which the several
Flow introducing means (40) everything over a common
Turbulence chamber (34) with the input (44) - verbun that are.

7. Device according to claim 5 or 6, with which the several flow deriving means (42) are all over a ge meinsame output chamber (38) with the pump (30) federations.

8. Device after claims a 3 to 7, with which the flow introducing means (40) in the range of their sten it end (41a) in their sectional shape in approximately that
Correspond to sectional shape of the associated culture vessel (22).

9. Device according to claim 8, which for subjecting to culture vessels (22), which a circular crosswise cut exhibits, with a gaseous medium ausge puts is and with which the flow introducing means (40) have egg nen circular cross section at least in the range of its first end (41a), whereby the outer one is 40) somewhat smaller diameter of a flow introducing means (than the inner diameter of the associated Kul of door container (22) in the proximity of the surface of the culture received in the Kul door container (22) (23).

10. Device after one of the claims 3 to 9, with wel more cher the flow introducing means (40) with its first
End (41a) into the associated culture vessel (22) to short above the surface in the respective culture vessel (22) received culture (23) dives in.

11. Device according to claim 10 or 11, which break the one open to from culture vessels (22), itself to
Exhibit container soil conical tapering cross section, are with a gaseous medium designed, and those
Flow deriving means (42) in such a manner formed are that them with its first end (43a) concerning the Ge of the barrel-high culture vessel (22) only a short
Distance into the associated culture vessel (22) immerse.

12. Device after one of the claims 6 bis-11, with which the flow introducing means (40) as straight
Cylinder tube formed is far, its second end (41b) a certain distance into the common Turbulence chamber (34) rises up.

13. Device after one of the claims 7 to 12, formed with which the flow deriving means (42) is as straight Zy linderrohr, whose second end (43b) flows into the common output chamber (38).

14. Device according to claim 13, with which the Zylin is 40) somewhat smaller that outside diameter of the flow introducing means (than the cylinder inside diameter of the flow

deriving means (42) and which flow in guidance means (of 40) central within the flow deriving means (42) guided is.

15. Device according to claim 14, with which that bottom one separated between Zylinderaussen-und the Zylinderin more nendurchmesser plus the cylinder wall thickness of the flow deriving means (42) in for instance the difference of the inner diameter of the culture vessel (22) in height of the first end (41a) of the flow introducing means (40) and in height of the first end (43a) current derive by means of (42) corresponds.

16. Device after one of the claims 7 to 15, with which the output chamber (38) between the Verwirbe more lungskammer (34) and the culture vessels which can be taken up (22) arranged is, whereby the flow introducing means (40) by the output chamber (38) guided and over this airtight isolated are approximately.

17. Device after one of the claims 2 to 16, with which the pump (30) is more controllable in the pump power.

18. Method for subjecting one in a culture vessel (22) received culture (23) with a gaseous Medium, characterised in that a targeted
Current of the gaseous medium over essentially the whole surface of the culture (23) generated becomes.

19. Process according to claim 18, with which the gaseous
Medium over an input (44) sucked and by means of a flow guidance (40, 42) to the surface that
Culture (23) and from this to an output (31) ge leads becomes.

20. Process according to claim 18 or 19, with which the gaseous medium between the input (44) and that
Flow guidance (40, 42) for homogenization whirls becomes.

21. Exposition device for supplying one in a culture vessel (22) received culture (23) with a liquid medium, which furthermore a device (28) exhibits 1 to 17 after one of the claims.

22. Exposition device according to claim 21, which furthermore the subsequent covers: - a culture unit (10), which for the uptake of at least a culture vessel (22) serves, and one Supply unit (18, 20) to supplying that
Culture (23) in the culture vessel (22) with the liquid
Medium exhibits, - receiving means (8, 12) to the uptake that
Culture unit (10), and f - tionieren a mechanism (24, 26) to automatic poetry and coupling the culture unit (10) to the device (28) for subjecting the culture (23) with a gaseous medium.

23. Exposition device according to claim 22, with which the culture unit (10) furthermore a keep at a moderate temperaturable trough (14, 16) exhibit to the uptake of the culture vessels (22).

24. Exposition device according to claim 22 or 23, wel che furthermore a resilient supported contact plate (52) exhibits, which in the coupling position Kulturein heat (10) in contact with the edges of container of the culture of containers (22) arrived and resilient gives way.

25. Exposition device according to claim 24, with which
Sealant (53) to the contact plate provided, at least in the ranges, those in couple position with the edges of container of the culture vessels (22) in
Contact come.